

REMARKS

The Office Action dated February 15, 2007 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 11 and 19 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added, and no new issues are raised which require further consideration and/or search. Claims 1-19 are submitted for consideration.

Claims 8-10 and 16-18 were objected to as being dependent on a rejected base claim but would be allowable if rewritten. Based on the arguments presented below, Applicants submit that all of the presently pending claims are allowable and request that claims 8-10 and 16-18 be allowed in the present form.

Claims 1-7, 11-15, and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,101,399 to Raleigh (hereinafter Raleigh) in view of U.S. Patent No. 5,963,854 to Andreasson (hereinafter Andreasson). The Office Action took the position that Raleigh teaches each and every element recited in claims 1-7, 11-15, and 19, except for disclosing a tuning range of the electronically tunable diplexer covering at least two radio frequency sub-bands used parallel in a telecommunication system, the electronically tunable diplexer being tunable, on site, to a radio frequency sub-band allocated to a base station, and at least a portion of the signal chain being shared between frequencies within the tuning range. However, the Office Action cites

Andreasson as teaching this feature, and as such, the Office Action concluded that it would have been obvious to one of ordinary skill in the art to combine the teaching of the references to generate Applicants' claimed invention. Applicants traverse the rejection and respectfully submit that the cited combination of references, when taken alone or in combination, fails to teach or suggest each and every limitation recited in independent claims 1, 11 and 19 and the dependent claims thereon.

Claim 1, upon which claims 2-10 depend, recites a base station of a cellular telecommunication system including an antenna unit configured to receive and transmit radio frequency signals. The base station includes an electronically tunable diplexer connected to the antenna unit configured to separate a transmit radio frequency band from a receive radio frequency band, a tuning range of the electronically tunable diplexer covering at least two radio frequency sub-bands used in the same transmission direction in a telecommunication system. The electronically tunable diplexer is tunable, on site, to a radio frequency sub-band allocated to a base station according to an electric control signal. A transceiver connected to the electronically tunable diplexer is configured to perform a conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station. The transceiver includes a signal conversion chain configured to perform at least a portion of the conversion. At least a portion of the signal conversion chain is shared between frequencies within the tuning range of a sub-band.

Claim 11, upon which claims 12-18 depend, recites a method of configuring a base station in a cellular telecommunication system. The method includes tuning, on site,

an electronically tunable diplexer connected to an antenna unit according to an electric control signal, a tuning range of the electronically tunable diplexer covering at least two radio frequency sub-bands used in the same transmission direction in a telecommunication system, to a radio frequency sub-band allocated to a base station. The method also includes adjusting a transceiver connected to the electronically tunable diplexer to perform a conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station. The transceiver includes a signal conversion chain for performing at least a portion of the conversion, at least a portion of the signal conversion chain being shared between frequencies within the tuning range of a sub-band.

Claim 19 recites a base station in a cellular telecommunication system including tuning means for tuning, on site, an electronically tunable diplexer connected to an antenna unit according to an electric control signal, the a tuning range of the electronically tunable diplexer covering at least two radio frequency sub-bands used in the same transmission direction in the a telecommunication system, to a radio frequency sub-band allocated to the a base station. The base station in a cellular telecommunication system including adjusting means for adjusting a transceiver connected to the electronically tunable diplexer to perform a conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station. The transceiver includes a signal conversion chain for performing at least a portion of the conversion, at least a

portion of the signal conversion chain being shared between frequencies within the tuning range of a sub-band.

Applicants submit that Raleigh and Andreasson fail to teach or suggest the combination of elements recited in the presently pending claims.

Raleigh discloses a base station including a diplexer, which can be employed to allow an antenna array to be used for both transmit and receive operation by isolating the RF receiver from the RF transmitter. A receive channel beamformer cooperates with the RF receiver to adaptively optimize the receive antenna beam in order to improve received signal quality. See at least Col. 5, lines 5-8 of Raleigh.

In Raleigh, distinct antenna arrays are used for signal reception and transmission as illustrated in FIG. 2B. In the embodiment of FIG. 2B, a diplexer is not required since a dedicated receive antenna array (not shown) is connected to the RF receiver, and a dedicated transmit antenna array (not shown) is connected to the RF transmitter. The receive and transmit antenna arrays are designed to provide identical radiation characteristics when operated at the receive and transmit frequencies, respectively. Accordingly, in many instances the physical geometries of the transmit and receive antenna arrays are simply physically scaled to account for the fractional difference in the receive and transmit RF wavelengths. The embodiment of FIG. 2B substantially eliminates the potential introduction of error arising from use of a single antenna array and diplexer. See at least Col. 5, lines 18-34.

Andreasson discloses an antenna amplifier that utilizes integrated dual duplex filters having a first filter branch for allowing through a transmitter band (Tx) between an uplead and an antenna, a second filter branch (Rx1) for allowing through a receiver band (Rx) from the antenna to an output element (3), a third filter branch for allowing through the receiving band (Rx) from an input element (4) to the uplead, and a low noise amplifier whose input is connected to the output element and whose output is connected to the input element. The low noise amplifier is preferably both constructed and connected by means of filter-technical and circuit board-technical methods. See at least the Abstract.

Applicant submits that the combination of Raleigh and Andreasson does not teach or suggest the combination of elements recited in any of the presently pending claims. Each of claims 1, 11 and 19, in part, recites an electronically tunable diplexer. Applicants submit that Raleigh does not teach or suggest a tunable diplexer, especially a diplexer that is electronically tunable. Furthermore, Raleigh does not teach or suggest that a tuning range of the electronically tunable diplexer covers at least two radio frequency sub-bands used in the same transmission direction in a telecommunication system. As noted above, an embodiment of Raleigh shown in figure 2B teaches away from applying a diplexer, as recited in the presenting pending claims. Specifically, in Col. 5, lines 18-34 of Raleigh, there is disclosure that a diplexer is not required since a dedicated receive antenna array (not shown) is connected to the RF receiver, and a dedicated transmit antenna array (not shown) is connected to the RF transmitter.

Each of claims 1, 11 and 19 also recites, in part, that the electronically tunable diplexer are tunable, on site, to a radio frequency sub-band allocated to a base station, a transceiver connected to the electronically tunable diplexer is configured to perform a conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station of a sub-band. Raleigh also does not teach or suggest these features.

Andreasson does not cure any of the deficiencies of Raleigh. Andreasson merely discloses that each duplex filter is comprised of two filters tuned to respective transmission and reception frequency bands. The cited section of Andreasson teaches that there are two filters, which have been tuned to respective transmission and reception frequency bands. However, Andreasson does not teach or suggest electric tunability on site.

The Office Action alleged that the Col. 3, lines 45 to 58 of Andreasson disclose an electrically tunable filter. The cited sections of Andreasson disclose that Fig. 1 illustrates schematically a known antenna amplifier connected between an antenna and an uplead Tower Mounted low noise Amplifier (TMA). Andreasson also discloses in the cited section that there are obtained with the aid of two duplex filters two conductor branches, one branch Tx for the transmitter signal and another branch Rx for the received signal, it being possible to mutually separate the signals through filters by virtue of the signals lying in different frequency bands. According to Andreasson, such broadband filters may be comprised of resonators having slightly different tuning frequencies in comb-line filters. Andreasson also noted that it will be evident that four such filters are included in this configuration, namely one bandpass filter for the Tx frequency band and one

bandpass filter for the Rx frequency band in each duplexer. The low noise amplifier LNA, of Andreasson, is connected in the Rx branch.

The cited sections of Andreasson, therefore, discloses duplex filters, but fail to disclose electrically tunable filters, which are tunable on site. In Andreasson, the tuning related to the broadband filter is based on trimming screws 12 which based on a general knowledge, are used during the installation or manufacture of the antenna arrangement. See at least Col. 6, line 63 and Col. 8, lines 15-17 of Andreasson. The trimming screws of Andreasson, therefore, cannot be related to an electronic tuning means of an electrically tunable diplexer, which is tunable on site. Furthermore, all of figures of Andreasson fail to indicate any technical features that suggests of tuning a diplexer electronically. The use of trimming screws teaches a person skilled in the art away from using Andreasson's teachings, because Andreasson already utilizes a tuning mechanism.

Andreasson also fails to disclose that at least a portion of the signal conversion chain be shared between frequencies within the tuning range. In fact, Andreasson fails to discuss any structure of a transceiver.

Figure 3 of Raleigh shows that boxes 112 and 160 illustrate a complex down-converter and a complex up-converter connected, respectively to a diplexer. However, the complex down-converter and the complex up-converter are separate elements of the REF receiver 54, and therefore, a person having the disclosure of Raleigh, would not be motivated to combine the teachings of Andreasson with teachings of Raleigh.

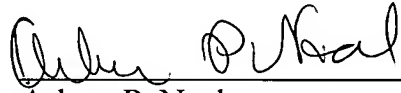
Furthermore, one skilled in the art would not have been motivated to yield the elements recited in the presently pending claims by amending the teaching of Raleigh in light of the teaching of Andreasson. In light of the arguments presented above, Applicants respectfully assert that the rejection under 35 U.S.C. §103(a) should be withdrawn because neither Andreasson nor Raleigh, whether taken singly or combined, teaches or suggests each feature of claims 1, 11 and 19 and hence, dependent claims 2-10 and 12-18 thereon.

As noted previously, claims 1-19 recite subject matter which is neither disclosed nor suggested in the prior art references cited in the Office Action. It is therefore respectfully requested that all of claims 1-19 be allowed and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,


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Enclosures: Petition for Extension of Time
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